CLAIMS

1. A method of preparing a RecA-like recombinase/single-stranded nucleic acid probe complex, the method comprising reacting a single-stranded nucleic acid probe sample containing a homologous probe with a RecA-like recombinase in the presence of a nonhydrolyzable nucleotide co-factor the number of molecules of which is one quarter or more of the number of molecules of nucleotide residues in the single-stranded nucleic acid probe and 10 times or less the number of molecules of the RecA-like recombinase.

2. The method of claim 1, wherein the nonhydrolyzable nucleotide co-factor is ATPγS, ADP · AlF_4^- (a mixture of ATP, aluminum nitrate, and sodium fluoride, or a mixture of ADP, aluminum nitrate, and sodium fluoride), dADP · AlF_4^- (a mixture of dATP, aluminum nitrate, and sodium fluoride, or a mixture of dADP, aluminum nitrate, and sodium fluoride), ADP · BeF_3^- (a mixture of ATP, beryllium sulfate, and sodium fluoride, or a mixture of ADP, beryllium sulfate, and sodium fluoride), or dADP · BeF_3^- (a mixture of dATP, beryllium sulfate, and sodium fluoride, or a mixture of dADP, beryllium sulfate, and sodium fluoride).

3. The method of claim 1, wherein the homologous probe is at least two types of homologous probes that are sufficiently complementary to one another.

4. The method of any one of claims 1 to 3, wherein the single-stranded nucleic acid probe sample is a mixture of the homologous probe and at least one type of heterologous probe.

5. The method of claim 1, wherein the single-stranded nucleic acid probe sample is reacted with the RecA-like recombinase in the presence of 0.5 to 2.0 mM magnesium ions.

6. The method of claim 1, wherein the RecA-like recombinase is derived from a prokaryote.

7. The method of claim 1, wherein the RecA-like recombinase is derived from *Escherichia coli*.

8. The method of any one of claims 1, 6, and 7, wherein the RecA-like recombinase has a label or a ligand.

9. The method of any one of claims 1 to 7, wherein the homologous probe has a label or a ligand.

10. A kit comprising the RecA-like recombinase and the nonhydrolyzable nucleotide co-factor, the kit being used for preparing the RecA-like recombinase/single-stranded nucleic acid probe complex of any one of claims 1 to 9.

11. A method for targeting, enriching, detecting, and/or isolating a double-stranded target nucleic acid in a sample, the method comprising:

(a) contacting a RecA-like recombinase/single-stranded nucleic acid probe complex prepared by the method of claim 9 with a sample containing the double-stranded target nucleic acid;

(b) trapping, onto a solid phase, a formed complex of the double-stranded target nucleic acid with the homologous probe having a label or a ligand; and

(c) removing the double-stranded nucleic acid and the probe that are not trapped onto the solid phase.

12. A method for targeting, enriching, detecting, and/or isolating a double-stranded target nucleic acid in a sample, the method comprising:

(a) contacting a RecA-like recombinase/single-stranded nucleic acid probe complex prepared by the method of claim 9 with a sample containing the double-stranded target nucleic acid inserted into a transformation vector;

(b) trapping, onto a solid phase, a formed complex of the double-stranded target nucleic acid with the homologous probe having a label or a ligand;

(c) removing the double-stranded nucleic acid and the probe that are not trapped onto the solid phase;

(d) releasing, from the solid phase, a fraction containing the double-stranded target nucleic acid trapped onto the solid phase, and transforming an appropriate host cell with the fraction; and

(e) selecting the transformed cell carrying the double-stranded target nucleic acid.

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13. The method of any one of claims 8, 9, 11, and 12, wherein the label or ligand is biotin or digoxigenin.

14. The method of claim 13, wherein the solid phase is magnetic beads to which avidin (streptavidin) or anti-digoxigenin antibody

is bound.

15. A method for detecting a double-stranded target nucleic acid in a fixed cell sample by *in situ* hybridization, wherein the RecA-like recombinase/single-stranded nucleic acid probe complex prepared by the method of claim 8 or 9 is used.

16. A method for targeting a double-stranded target nucleic acid in a living cell sample by *in vivo* gene targeting, wherein the RecA-like recombinase/single-stranded nucleic acid probe complex prepared by the method of any one of claims 1 to 9 is used.

17. The method of any one of claims 1, 11, 12, 15, and 16, wherein the double-stranded target nucleic acid is double-stranded target DNA.

18. The method of any one of claims 11 to 16, wherein the RecA-like recombinase/single-stranded nucleic acid probe complex is reacted with a sample containing the double-stranded target nucleic acid in the presence of monovalent cations.

19. The method of claim 18, wherein the monovalent cations are sodium ions or potassium ions.

20. The method of claim 19, wherein the sodium ions are derived from 150 mM or less sodium chloride or 250 mM or less sodium acetate and the potassium ions are derived from 150 mM or less potassium chloride or 250 mM or less potassium acetate.

21. A kit for targeting, enriching, detecting, and/or isolating double-stranded target nucleic acid in a sample, the kit comprising the RecA-like recombinase/single-stranded nucleic acid probe complex prepared by a method of any one of claims 1 to 9.